

# Intel® C++ Compiler 7.0 for Linux\*

## Getting Started Guide

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### **Overview**

This document explains how to install the Intel® C++ compiler for Linux\*, build "Hello World" for IA-32 and Intel® Itanium® processor based systems and how to get started optimizing your applications with the Intel® compilers.

The Intel C++ Compiler 7.0 for Linux consists of the following:

- Intel C++ Compiler for IA-32 based applications: `icc`
- Intel C++ Compiler for Itanium processor-based applications: `ecc`
- Linux Application Debugger 7.0 for IA-32 based applications: `ldb`
- Linux Application Debugger 7.0 for Itanium based applications: `ldb`
- Intel Itanium Assembler 7.0 for Itanium based applications: `ias`
- Product documentation

### **Supported Linux Distributions**

This version of the Intel compilers for Linux supports Linux distributions with the following combinations of glibc, the C language library, and the Linux kernel.

Supported IA-32 based systems:

- Distribution with 2.2.4 glibc & 2.4.X kernel; or
- Distribution with 2.2.5 glibc & 2.4.X kernel.

Supported Itanium processor based systems:

- Distribution with 2.2.3 glibc & 2.4.X kernel; or
- Distribution with 2.2.4 glibc & 2.4.X kernel

## **System Requirements**

### **IA-32 Processor System Requirements**

- A computer based on a Pentium® processor or subsequent IA-32 based processor. A Pentium 4 or Intel® Xeon™ processor is recommended.
- 128 MB of RAM, 256 MB recommended.
- 100 MB of disk space, plus an additional 200 MB during installation for the download and temporary files.
- A supported Linux distribution, see Supported Linux Distributions section.

### **Itanium Processor System Requirements**

- A computer with an Itanium or Itanium® 2 processor.
- 256 MB of RAM
- 100 MB of disk space, plus an additional 200 MB during installation for the download and temporary files.
- A supported Linux distribution, see Supported Linux Distributions section.

## **Installation Notes**

The Intel compilers use the Globetrotter\* FLEXlm\* electronic licensing technology. A valid license is needed to install the compilers. Following are the steps to install the compiler:

1. The installation program of Intel C++ Compiler 7.0 checks for a valid license before installing any component of the product. Also, the license must remain in place on the system in order to use the Intel C++ Compiler to compile and build programs. If you have downloaded the compiler from Intel® Premier Support, the license key you received with your 6.0 compiler will work with the 7.0 provided your support services have not expired.

Here is how to setup the license file before installation.

- If you have an electronically downloaded version of the Intel C++ Compiler 7.0, the license will be sent to you via email. Please follow the instructions in the email to install the license file.
- If you have a CD version of the Intel C++ Compiler 7.0, a valid license is included on the CD and the installation program can locate it automatically. But, in order to obtain access to technical support and to be able to download and execute product updates, as a **CD-ROM user** you must do the following:
  - **Register your product:** First, locate the serial number found on the inside flap of the product box. Then, visit the web site <http://www.intel.com/software/products/registrationcenter/index.htm> and follow the instructions. After the registration you will receive an email within 24 hours containing a new license.

- **Install the new license:** The new license in the email entitles you to one year of support services that allow you to download and execute product updates and obtain full technical support. The email also contains the instructions on how to install the license. Please follow the instructions to finish the new license installation.

For details about the support service license, please see

<http://www.intel.com/software/products/compilers/clin/pricelist.htm>

2. If you downloaded the compiler, untar the compiler package.
3. Login as the root user and execute the install script, "**install**". Please note that you may not be able to run the 'rpm' command successfully if you are not logged in as a root user. It is possible to install the compilers without root access by unpacking the RPM files with rpm2cpio and editing the compiler environment and configuration files, described below, but this installation method is not supported.
4. Select the compiler or debugger to install. The default RPM options "**-U --replacefiles**" are recommended to update existing files. The recommended installation directory is `/opt/intel`.
5. After the installation process, all the packages that are successfully installed are listed. Please confirm that this list is accurate and Enter "x" to exit.
6. Execute the appropriate script to setup the compiler environment variables:
7. `source <install-dir>/compiler70/ia32/bin/iccvars.sh(.csh);`
8. `source <install-dir>/compiler70/ia64/bin/eccvars.sh(.csh).`
9. Run the compiler.

## Compiler Environment and Configuration Scripts Information

The compilers use environment variables that can be easily set by the following scripts.

`<install-dir>/compiler70/ia32/bin/iccvars.sh(.csh)`

for IA-32 applications, and

`<install-dir>/compiler70/ia64/bin/eccvars.sh(.csh)`

for Itanium processor-based applications.

Default compiler options are stored in the following configuration files.

`<install-dir>/compiler70/ia32/bin/icc.cfg`

for IA-32 applications and

`<install-dir>/compiler70/ia64/bin/ecc.cfg`

for Itanium processor based applications.

They contain common settings and can be used to add additional system-wide default compilation options. Please note that you will need to save and restore any custom options in the configuration files, when you install a new version of the Intel compiler.

## Installation Warning for RPM 4.0.2

RPM 4.0.2 cannot install to a non-default directory. This has been resolved in RPM 4.0.3.

## Uninstalling the Compiler

Login as root and run the uninstall script:

- `<install-dir>/compiler70/ia32/bin/uninstall` on IA-32 based systems.
- `<install-dir>/compiler70/ia64/bin/uninstall` on Itanium based systems.

## ***Building "Hello World"***

Building the classic "Hello World" program is described. After successful installation with a valid FLEXlm license, the configuration scripts, `iccvars.sh(csh)` or `eccvars.sh(csh)`, must be [sourced as described above](#). Then, execute these steps:

1. Create a simple "Hello World" C++ program in a text editor 'hello.C':

```
#include <iostream>
int main() {
    std::cout << "Hello World !" << std::endl;
    return 0; }
```
2. Set up Intel C++ Compiler environment variables as discussed above:  
**iccvars.sh** for IA-32 applications or **eccvars.sh** for Itanium based applications.
3. Compile hello.C :
  - **icc hello.C -o hello.** Creates IA-32 application.
  - **ecc hello.C -o hello.** Creates Itanium-based application
4. Run the executable: `./hello`, it should display "Hello World!".

## ***Getting Started with Compiler Optimizations***

The Intel C++ Compiler enables programmers to take full advantage of the advanced performance enhancement features of Intel's latest IA-32 and Itanium processors and includes advanced optimizations. These optimizations are intended for use in product-release builds of applications, not necessarily for earlier phases of application development cycles. In general, increasing the degree of optimization done by the compiler leads to an increase in compile-time and reduced debugging capability. This section describes an optimization methodology with the Intel C++ Compiler.

To start to optimize, the default optimization `"-O2"` is recommended. Interprocedural optimization allows the compiler to optimize across different compilation units and can have large performance improvements. Profile guided optimization uses information from running an instrumented executable that allows the compiler to rebuild the application knowing where the majority of the computations are. Processor specific optimizations can also yield large performance improvements, for example, `-QaxW -tpp7` on IA-32 to optimize for the Pentium 4 processor, `-G2` on IPF to optimize for Itanium 2. Of course, not all optimizations are beneficial for all applications. During the application development process, the `"-g -O0"` switches could allow faster compile times and full debugging with no optimization.

Please see the paper, "**Optimizing Applications with the Intel C++ and Fortran Compilers**", available at <http://www.intel.com/software/products/compilers/clin>, for additional details. For complete information on the individual optimizations, please refer to Intel C++ Compiler User's Guide at `<install-dir>/compiler70/docs/c_ug_lnx.pdf`.

Remember to always measure the performance of your application after each optimization added to verify the benefits. The VTune™ Performance Analyzer can be a great help for measuring the performance benefits of each, as well as giving advice on

further tuning opportunities, additional information is available at <http://www.intel.com/software/products/vtune/>.

## ***Additional Information***

Your feedback is very important to us. To receive technical support for the tools provided in this product and technical information including FAQ's and compiler updates, you need to be registered for an Intel Premier Support account on our secure web site, <https://premier.intel.com/>. You can register for an Intel Premier Support at <http://support.intel.com/support/performance/c/linux>. Note, if you already have access to Intel Premier Support and the “Intel C++ Compiler for Linux” product you do not need to re-register. Compiler support information, including top technical issues and known issues is available at <http://support.intel.com/support/performance/c/linux>.

The product release notes contain additional information is located at <install-dir>/compiler70/docs/C++ReleaseNotes.htm. The Compiler User's Guide is located at <install-dir>/compiler70/docs/c\_ug\_lnx.pdf

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